REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Claims 1-15, 17, 18, and 20-25 have been canceled in favor of new claims 26-49. Support for the subject matter of the new claims is provided for example in paragraph [0157] of the specification.

Claims 1-3, 5, 10, 13-15, 17, 18, 20, 22, 24, and 25 were rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427). Claim 11 was rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427) and Ranta-Aho et al. (US 2005/0163056). Claim 12 was rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427), Ranta-Aho et al. (US 2005/0163056), and Sebire et al. (US 2006/0031563). Claims 4 and 21 were rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427) and Mueckenheim et al. (US 2006/0215604). Claims 6 and 7 were rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427) and Sagfors et al. (US 2006/0159016). Claim 8 was rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427), Sagfors et al. (US 2006/0159016), and Mueckenheim et al. (US 2006/0215604). Claims 9 and 23 were rejected, under 35 USC §103(a), as being unpatentable over Toskala et al. (US 2003/0219037) in view of Ranta-Aho et al. (US 6,970,427) , Sagfors et al. (US 2006/0159016), and 3GPP (3GPP

TSG-RAN WG2 #46 Happy bit with mirroring). To the extent these rejections may be deemed applicable to new claims 26-45, the Applicants respectfully traverse based on the points set forth below.

Claim 26 recites features of canceled claims 1 and 2 and defines a method for communicating control information associated with uplink data on an Enhanced Dedicated Channel (E-DCH) of a Universal Mobile Telecommunication System (UMTS). According to this method, a happy bit is transmitted, by a user equipment to a serving cell node, indicating whether the user equipment could use more than a maximum amount of uplink resources allowed by scheduling grants for transmitting scheduled uplink data via the E-DCH. The happy bit provides a negative indication if the user equipment transmits uplink data via the E-DCH without utilizing the maximum amount of uplink resources, for scheduled uplink data, as allowed by scheduling grants. The claimed subject matter supports granting additional communication resources to a user equipment only if the user equipment is using the maximum uplink resources granted to it by a serving cell (see specification page 18, lines 26-31). Additionally, the claimed subject matter supports a serving cell's ability to determine whether a non-serving cell, within the user equipment's active set, has requested the user equipment to reduce its uplink resource utilization during a soft handover (see page 18, line 31, through page 19, line 2). (References herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to the referenced embodiments.)

As indicated above, claim 26 has been limited specifically to uplink data transmissions on an E-DCH channel of a UMTS system and the use of the UMTS-specific "happy-bit" that indicates to a Node B scheduler whether the signaling user equipment (UE) could use more than

the maximum amount of uplink resources allowed by scheduling grants, received by the UE, for transmissions via the E-DCH.

By contrast to the Applicants' claimed subject matter, Toskala discloses signaling a "rate change request" (RR) in the form of a single bit and a corresponding rate control signal to command a user equipment to adjust its uplink rate. In this respect, Toskala teaches a method to control the uplink rate used by the user equipment in communicating on the uplink (see Toskala paragraph [0007]). Essentially, the uplink rate is controlled by signaling "request answers" (RA), in response to the corresponding "rate change requests" (RR) from the user equipment, that in effect command the user equipment to increase, decrease, or maintain its current rate or maximum rate for uplink transmission (see paragraphs [0008] and [0022]-[0024]). The rate change request (RR) can be conveyed as one bit to request the increase or decrease of the uplink rate (see paragraph [0025]).

Toskala's paragraphs 27-32 provide a more detailed outline of how such as system could be implemented. Therein, Toskala discloses that the rate change requests may be sent via a new uplink dedicated physical control channel, such as an enhanced uplink dedicated physical control channel (EU-DPCCH) (see paragraph [0029]).

Furthermore, Toskala discloses that the main contribution of the invention is that it adds the ability for a serving RNC to delegate, to a Node B, a part of its connection management maintenance responsibility, namely uplink radio resource control with restrictions that Node B can control the uplink resource based on a bit-efficient signaling mechanism (see paragraph [0047]).

Accordingly, Toskala discloses a basic rate control mechanism employing one-bit rate change requests (RR) and corresponding rate control messages (rate answers - RA).

Ranta-Aho '427 relates to a similar rate change request and request answer mechanism. While Toskala focuses on describing the basis of the rate change request and request answer mechanism, Ranta-Aho '427 focuses on the potential misalignment of pointers within a user equipment and Node B that should both indicate the (same) maximum transport format combination (data rate) the user equipment is allowed to use for uplink transmission. Due to transmission errors in the relative grant messages (rate answers — RA), a misalignment of these pointers can occur, for example, in case the user equipment misinterprets a relative grant (see Ranta-Aho '427 col. 1, lines 33-52, and col. 3, lines 14-30 and 52-65).

To detect such misalignment in the Node B, Ranta-Aho '427 suggests that a UE is prohibited from requesting an increment to the pointer (i.e., is prohibited to send a rate request to increase the data rate) unless the UE is transmitting at the maximum allowed rate according to the pointer in the UE (see col. 2, lines 15-20, and col. 4, lines 31-60).

Applicants note that Toskala's and Ranta-Aho '427's disclosures were filed in 2002 and 2003, respectively. Accordingly, these documents were filed prior to the introduction of the "happy-bit" in the 3GPP discussion. According to one of the present inventors, Mr. Lohr, the "happy-bit" was first discussed within 3GPP in November of 2003 (see 3GPP TS 25.309, version 6.2.0).

Accordingly, the Applicants submit that Toskala and Ranta-Aho '427 cannot disclose the claimed subject matter of UMTS transmissions on an E-DCH using a "happy-bit," since the "happy-bit" did not exist at the time Toskala's and Ranta-Aho '427's disclosures were filed.

Therefore, Toskala and Ranta-Aho '427 fail to teach all features related to the "happy-bit" and in particular fail to disclose the function and meaning of the "happy-bit" indicating "to the Node B whether or not the user equipment could use more than a maximum amount of uplink resources allowed by scheduling grants for transmitting scheduled uplink data via the E-DCH." Additionally, Toskala and Ranta-Aho '427 fail to disclose the claimed criteria for setting the "happy-bit," as recited in new claims 26, 27, 32, 36, 38, 44, and 45 and, as such, fail to render the claimed invention obvious to the skilled person.

Furthermore, with respect to Toskala, the Applicants submit that although paragraph [0029] refers to uplink signaling that could be implemented using an enhanced uplink dedicated physical control channel (EU-DPCCH), this passage fails to explicitly teach the uplink data being transmitted on an enhanced dedicated uplink channel (E-DCH), as now recited in the independent claims.

Regarding Ranta-Aho '427, this document relates to a completely different technical problem than that of the Applicants' claimed invention. This is, in fact, a result of the different scheduling approach assumed by Ranta-Aho '427, upon its filing date, in view of the above-mentioned changes that have occurred in the 3GPP discussion in the time span up to the filing date of the present application.

In Ranta-Aho '427, differential rate signaling is used where the relative grants update the scheduled data rate (i.e., maximum TFC pointer) relative to the previous absolute or relative grant (see Ranta-Aho '427 col. 1, lines 23-29, and col. 3, lines 20-22). If there is an error in the interpretation of a relative grant, this differential update mechanism will lead to the error propagating, at least until another absolute grant is received (see col. 8, lines 46-48). Ranta-Aho

'427 aims to tackle this error propagation, which is referred to as a misalignment of the max TFC pointers in UE and Node B (see col. 1, lines 50-52, and col. 3, lines 52-65), by introducing a timer setting a delay controlled by an RNC used in detecting a misalignment (see col. 3, lines 22-28). Although difficult to understand from Ranta-Aho '427, the detection mechanism assumes that the UE transmits at least once with the maximum data rate during the delay controlled by the timer (see col. 4, lines 28-30). Accordingly, the Node B can monitor, during this delay, which maximum TFC pointer the UE is using and may match this detected maximum TFC pointer with its internal maximum TFC pointer for the UE.

In contrast thereto, all grants (relative and absolute grants) in the present claimed invention may relate to the last used uplink power ratio (see the specification at page 12, lines 12-19, and claims 29-31 and 41-43), so that the grant is referencing an absolute parameter. Accordingly, no misalignment of the scheduled resource between the UE and Node B can propagate in the scheduling scheme of the claimed invention. Therefore, the present claimed invention is not related to avoiding misalignment caused by a signaling error (which cannot occur in the scheduling approach of the invention), but to allow a Node B to detect "down" commands from non-serving cells during soft-handover (see new claim 34).

In addition, the rate change request (RR) in Toskala and Ranta-Aho '427 serves a different purpose than the "happy-bit" in the claimed invention. Toskala and Ranta-Aho '427 introduce a rate change request and rate answer mechanism (i.e., relate to an explicit request to increase or decrease the data rate) and a corresponding reaction from the scheduler. In contrast, as now recited in the independent claims, the "happy-bit" is a status report rather than a scheduling request and indicates only whether the user equipment could use more than the

maximum amount of uplink resources allowed by scheduling grants for transmitting scheduled uplink data via an E-DCH.

Toskala and Ranta-Aho '427 refer to data rate scheduling where the data rate is controlled by the scheduler, while the claimed invention is related to controlling the maximum amount of uplink resources (for example by controlling the maximum power ratio the user is allowed for transmission) of scheduled uplink data on the E-DCH (see new claims 28-30 and 40-42).

Concerning new claims 27 and 39, Toskala and Ranta-Aho '427 fail to disclose the recited set of criteria for setting the "happy-bit."

Claims 27, 32, 39, and 44 recite features of canceled claim 4, which was rejected over the teachings of Toskala in view of Ranta-Aho '427 and Mueckenheim.

Mueckenheim relates to uplink transmission on an E-DCH. In this context, Mueckenheim discloses the transmission of relative grants to adjust (increase or decrease) the selected transport format combination provided by an absolute grant by means of UP, DOWN or HOLD commands (see Mueckenheim paragraph [0061]).

In this context, Mueckenheim states that a rate request bit (e.g., a "Happy Bit") may indicate whether a UE is satisfied with current parameters (i.e., a maximum ETFC) provided by a previous absolute grant or relative grant. This definition is, of course, in accordance with the ongoing development in 3GPP at the time Applicants filed their application. Mueckenheim discloses that a UE should set the "happy-bit" only if it has power available to transmit data at the higher transport format combination and the total amount of data in a transport buffer would require a greater number of TTIs than currently allotted.

In contrast to the present claimed invention, Mueckenheim does not teach an improved set of criteria for setting the "happy-bit," but suggests a completely different rule for setting the "happy-bit." Instead of the "happy-bit" indicating whether the UE is satisfied with a current parameter, Mueckenheim discloses that the "happy-bit" should indicate whether data is present in the data buffer of the UE (see Mueckenheim paragraph [0035]). With this definition, Mueckenheim proposes, in relation to Fig. 4, that upon the physical layer within the UE detecting that a packet is present in the transmission buffer, the physical layer within the UE indicates the reception of the packet to the Node B by setting the "rate request bit" to "up" (i.e., setting the "happy-bit" to "unhappy" (see paragraph [0039] and paragraph [0040]).

In this context, the "happy-bit" is used as a rate request bit from the UE that invokes the Node B to schedule the UE and to send a relative grant to the UE such that same may transmit the uplink data in the buffer (see paragraph [0042] and paragraph [0043]). Furthermore, additional information for assisting the scheduler may be provided with MAC-e PDUs, i.e., inside the individual PDUs sent via the E-DCH to the scheduler (see paragraph [0058]).

Upon reception of the relative grant "up," the UE transmits the entire data in the buffer using the E-DCH. Upon having transmitted the data, the UE deletes the discard timer and indicates to the Node B an empty transmission buffer by sending a "hold" rate request bit (i.e., a "happy-bit" set to "happy"). In order to disable further uncontrolled transmissions to the UE, the Node B may send a relative grant "down" to the UE (see paragraphs [0044]-[0047]).

According to Mueckenheim, the "happy-bit" is transmitted prior to the actual transmission of the E-DCH data indicating an "unhappy" condition (rate request bit "up") and is then -- upon having transmitted all data on the E-DCH -- set to "happy" so as to indicate that no

further data is present in the buffer of the UE ("hold" rate request bit). Essentially, Mueckenheim discloses using the "happy-bit" as a request that is triggering a relative grant and a request to stop scheduling, upon having sent all data in the buffer, that is triggering a down command from the network.

Even if the teaching of Mueckenheim were combined with the disclosures of Toskala and Ranta-Aho '427, the resulting system would not correspond to the Applicants' claimed subject matter. Moreover, the teachings of Mueckenheim, Toskala, and Ranta-Aho '427 would be unobvious to combine. As outlined above, Mueckenheim discloses setting the "happy-bit" to an "unhappy" condition when data for transmission on the E-DCH enter the buffer of the UE, i.e., prior to the transmission of uplink data. In Mueckenheim, the "happy-bit" indicates a "happy" condition to indicate that all uplink data in the buffer has been transmitted. Mueckenheim appears not to send any "happy-bit" between having indicated the "unhappy" condition and having indicated the "happy" condition.

In contrast, Ranta-Aho '427 in combination with Toskala would suggest signaling something similar to an "unhappy" condition (a rate change request requesting the increase of the data rate) when uplink data is simultaneously sent with the maximum data rate (see Ranta-Aho '427 col. 4, lines 31-38). Accordingly, a skilled person would not consider the combination of the teachings provided by Toskala, Ranta-Aho '427, and Mueckenheim to thereby form a technically meaningful set of criteria to set or not set the "happy-bit."

Accordingly, the Applicants submit that Toskala and Ranta-Aho '427, considered individually or in combination, do not render obvious the subject matter defined by claim 26. Independent claims 38 and 45 similarly recite the above-mentioned subject matter distinguishing

method claim 26 from the applied references, but claim 38 does so with respect to an apparatus and claim 45 does so with respect to a computer readable medium. Therefore, allowance of claims 26, 38, and 45 and all claims dependent therefrom is deemed to be warranted.

Moreover, for the additional reasons identified above, the Applicants submit that Toskala, Ranta-Aho '427 and Mueckenheim, considered individually or in combination, do not render obvious the subject matter defined by claims 27, 32, 39, and 44. Therefore, allowance of claims 27, 32, 39, and 44 is considered to be warranted for these independent reasons.

In view of the above, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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Date: September 5, 2008
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